

Design of TM software		
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## REVISION HISTORY

Date	Version	Description	Author
21.12.2021	0.1	Software Architecture overview is created	Uygar KAYA
21.12.2021	0.2	InputOutput Package is created	Uygar KAYA
22.12.2021	0.3	Algorithm Package is created	Uygar KAYA
22.12.2021	0.4	The whole diagram is created	Uygar KAYA
23.12.2021	0.5	COTS Identification is created	Uygar KAYA
06.01.2022	0.6	Report was updated	Uygar KAYA

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## 1 Introduction

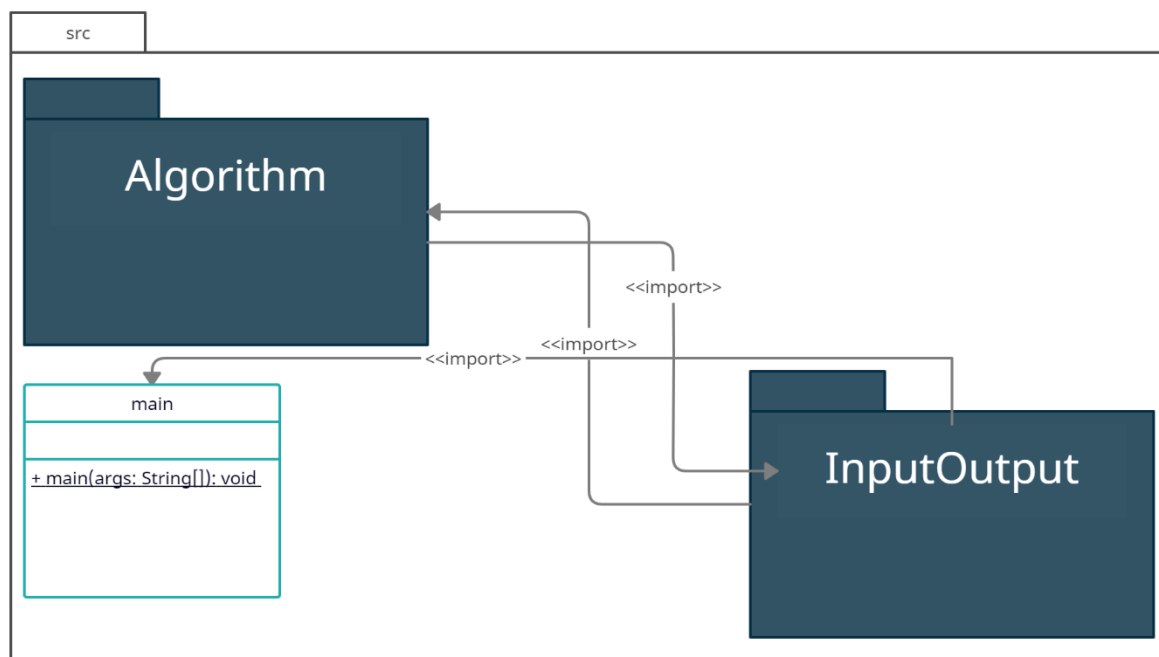
This document describes the design of the TM (Turing Machine) software system. In this project, I programmed the TM Algorithm, which is given a string the simulated TM should be able to tell if the string is accepted, rejected, or looped. In this project, I will implement the program with Java Programming Language.

### 1.1 References

#### 1.1.1 Project References

#	Document Identifier	Document Title
[R1]	DFA-SDD	Software Detailed Design Document of DFA
[R2]	PDA-SDD	Software Detailed Design Document of PDA

## 2 Software Architecture overview



## 3 Software design description

### 3.1 InputOutput

#### 3.1.1 Component interfaces

In the InputOutput Package, there are two classes which are InputFile & OutputFile

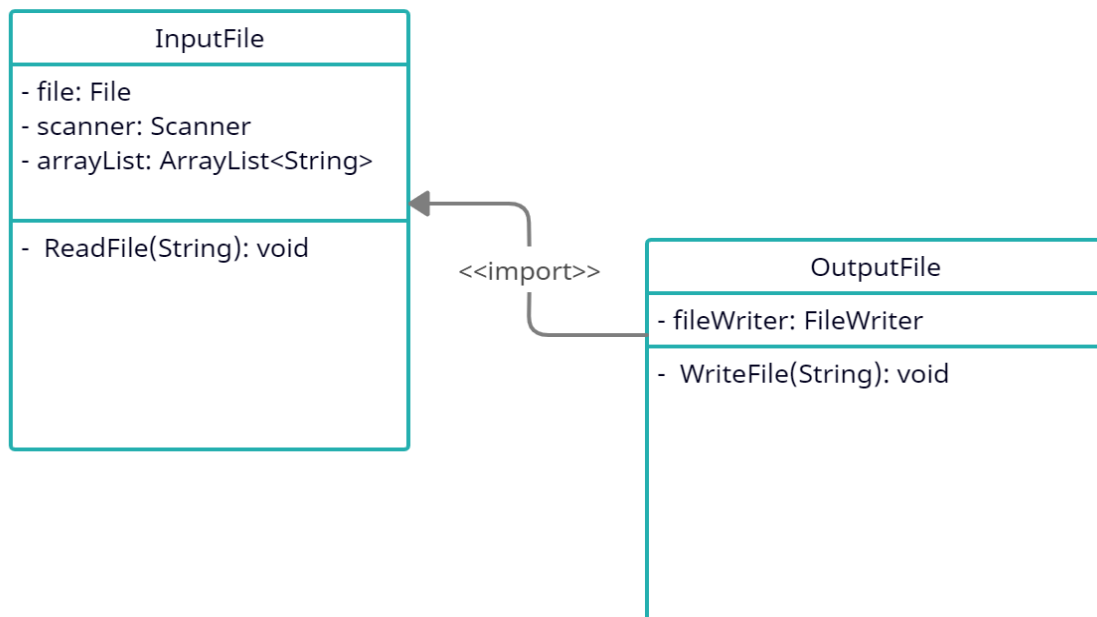
Methods of InputFile which are available from other components are:

**public void ReadFile(String filePath) – To read the input .txt file**

Methods of OutputFile which are available from other components are:

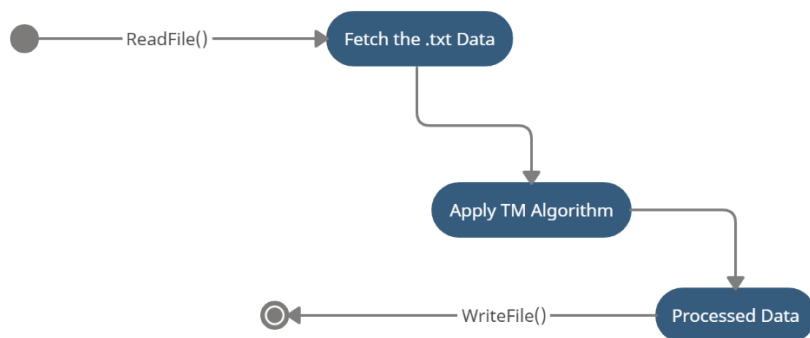
**public void WriteFile(String routeValidation) – To write the output .txt file**

### 3.1.2 Component design description



### 3.1.3 Workflows and algorithms

The Activity Diagram is given below:



## 3.2 Algorithm

### 3.2.1 Component interfaces

In the Algorithm Package, there are four classes which are Configuration, SeparateData, Tape & TuringMachineAlgorithm

Methods of Configuration which are available from other components are:

**public String getState()** – To get the current state

**public Tape getTape()** – To get the current tape contents

**public String getRoute()** – To get the exist route

Methods of SeparateData which are available from other components are:

**public void SplitData(ArrayList<String> arrayList)** – To separate the given ArrayList

Methods of Tape which are available from other components are:

**public void incDecTapeHead()** – To move the TapeHead Left or Right

**public int getTapeHead()** – To get the current tapeHead

**public List<String> getTapeInputs()** – To get the tape elements

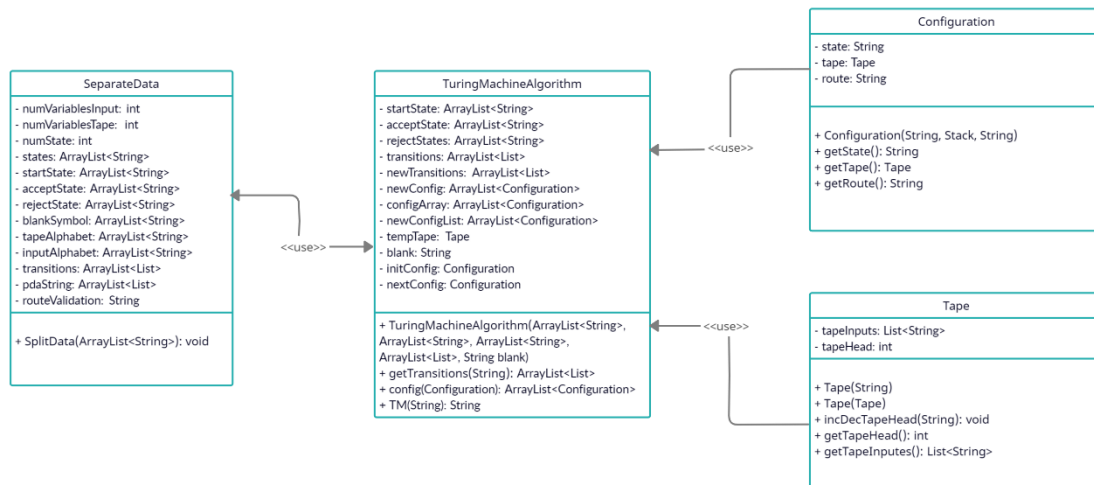
Methods of TuringMachineAlgorithm which are available from other components are:

**public ArrayList getTransitions(String state)** – To get the current state' transitions

**public String TM(String input)** – To apply the config method with routeValidate

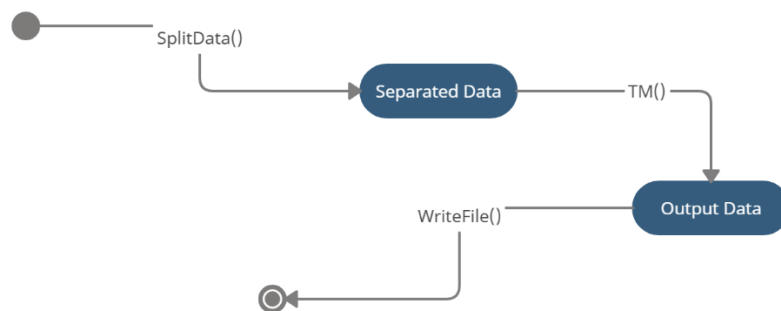
**public ArrayList config(Configuration configuration)**– To apply the TM Algorithm

### 3.2.2 Component design description



### 3.2.3 Workflows and algorithms

The Activity Diagram is given below:



## 3.3 The Whole Diagrams

### 3.3.1 Component interfaces

Methods of main which are available from other components are:

**public static void main(String[] args)** – To run the code

Methods of InputFile which are available from other components are:

**public void ReadFile(String filePath)** – To read the input .txt file

Methods of OutputFile which are available from other components are:

**public void WriteFile(String routeValidation)** – To write the output .txt file

Methods of Configuration which are available from other components are:

**public String getState()** – To get the current state

**public Tape getTape()** – To get the current tape contents

**public String getRoute()** – To get the exist route

Methods of SeparateData which are available from other components are:

**public void SplitData(ArrayList<String> arrayList)** – To separate the given ArrayList

Methods of Tape which are available from other components are:

**public void incDecTapeHead()** – To move the TapeHead Left or Right

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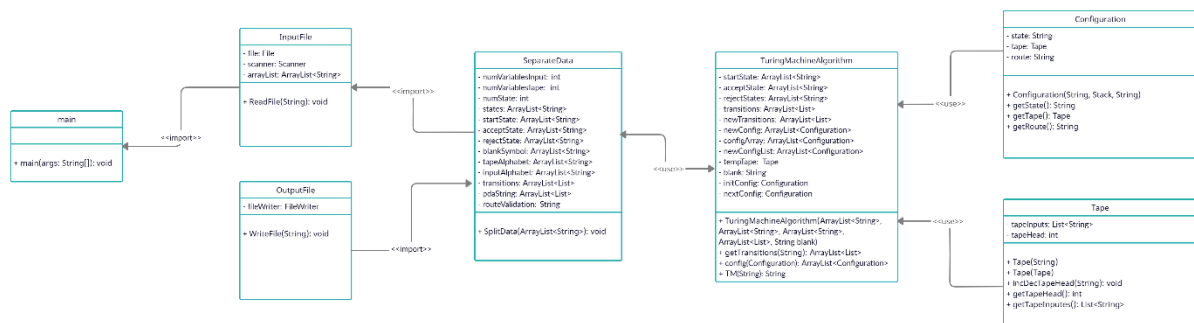
Methods of TuringMachineAlgorithm which are available from other components are:

**public ArrayList getTransitions(String state)** – To get the current state' transitions

**public String TM(String input)** – To apply the config method with routeValidate

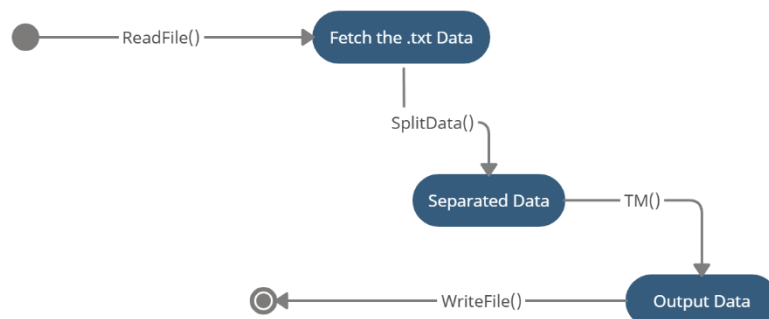
**public ArrayList config(Configuration configuration)**– To apply the TM Algorithm

### 3.3.2 Component design description



### 3.3.3 Workflows and algorithms

The Activity Diagram is given below:



## 4 COTS Identification

COTS (commercial of the shelf) libraries used in TM are the following:

- Java, JDK 8, <https://www.oracle.com/java/technologies/downloads/>